

22/10/2016

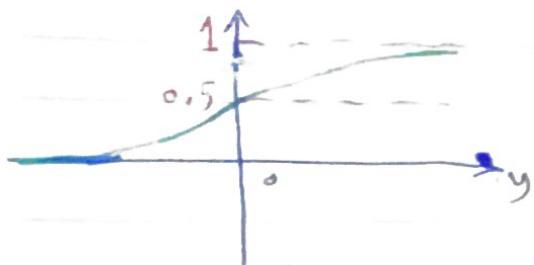
Ex 1

Ans. 1

4] \min

Sigmoidal fn

$$S = \frac{1}{1+e^{-y}}$$

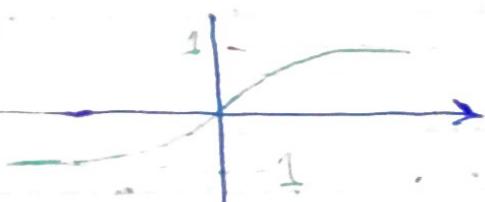


$$y = \ln \frac{S}{1-S}$$

Bipolar Sigmoidal fn

$$S = \frac{1}{1+e^{-y}} - 1$$

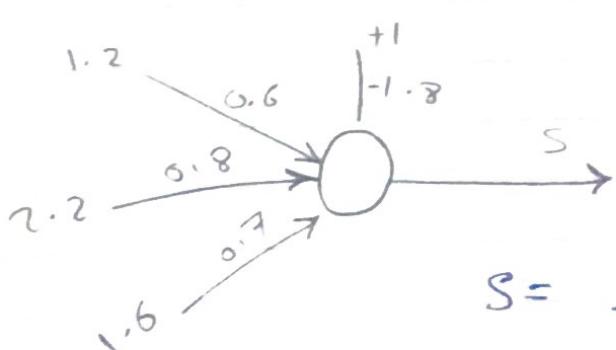
$$= \frac{1-e^{-y}}{1+e^{-y}}$$



$$y = \ln \left(\frac{1+S}{1-S} \right)$$

Sheet 2

14]



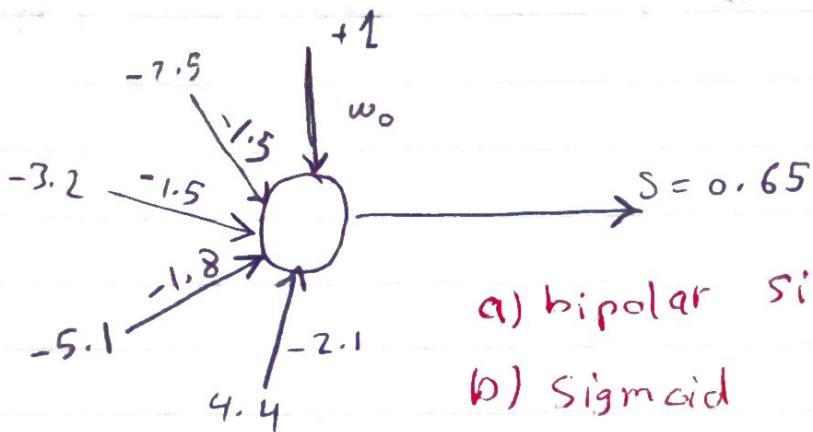
$$y = 1.2 \times 0.6 + 2.2 \times 0.8 \\ + 1.6 \times 0.7 + 1.8 \\ = 1.8$$

$$S = \frac{1-e^{-y}}{1+e^{-y}} = \frac{1-e^{-1.8}}{1+e^{-1.8}} = 0.716$$



11

15



a) bipolar sigmoid

b) Sigmoid

a) $y = -1 \cdot 11 + w_0$

$$y = \ln \left(\frac{1+s}{1-s} \right) = \ln \left(\frac{1+0.65}{1-0.65} \right) = 1.551$$

$$\Rightarrow w_0 = 1.551 + 1.11 = 2.661$$

b) $y = -1 \cdot 11 + w_0$

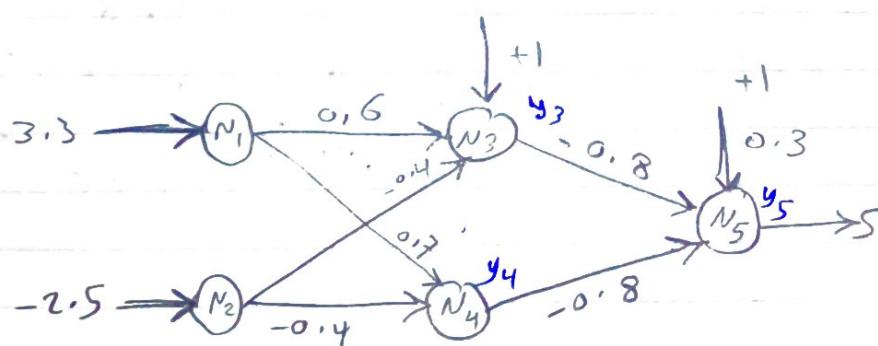
$$y = \ln \left(\frac{s}{1-s} \right) = \ln \left(\frac{0.65}{1-0.65} \right) = 0.619$$

$$\Rightarrow w_0 = 0.619 + 1.11 = 2.729$$

16

2 output neurons \rightarrow one output neuron

17



$$y_3 = 0.6 \cdot 3.3 + 0.4 \cdot 2.5 + 0.5 = 3.48$$

$$y_4 = 0.7 \cdot 3.3 + 0.4 \cdot 2.5 - 0.2 = 3.11$$

18

$$f(y_3) = \frac{1}{1 + e^{-y_3}} = \frac{1}{1 + e^{-3.48}} = 0.97$$

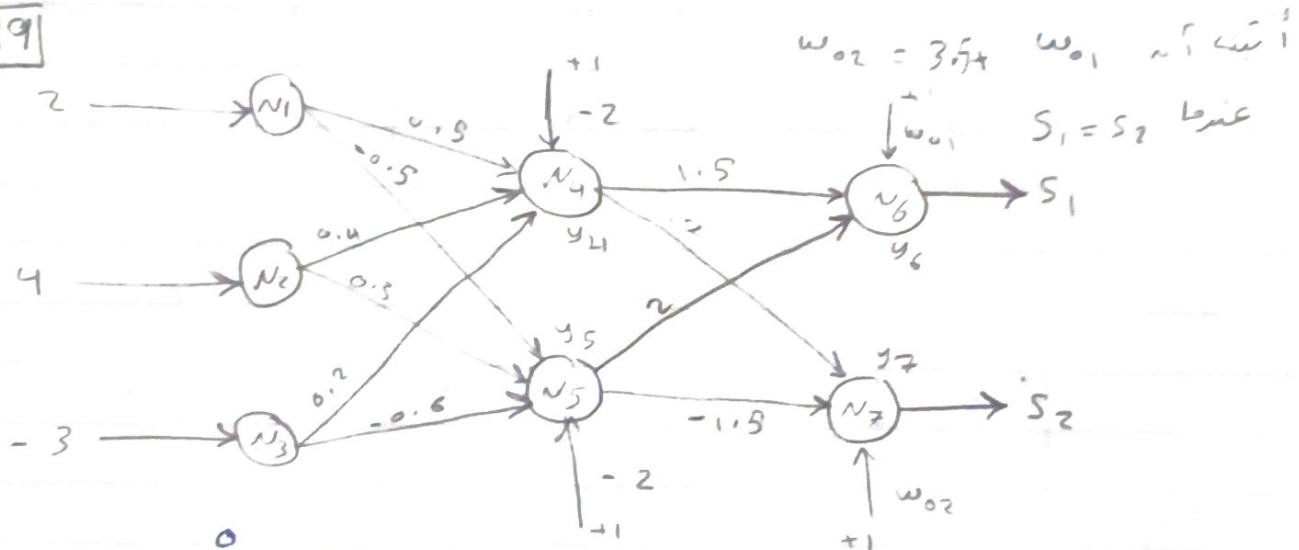
$$f(y_4) = \frac{1}{1 + e^{-y_4}} = \frac{1}{1 + e^{-3.1}} = 0.957$$

$$y_5 = 0.97 \times -0.8 + 0.957 \times -0.8 + 0.3 \\ = -1.242$$

$$s = \frac{1}{1 + e^{y_5}} = \frac{1}{1 + e^{-1.242}} = 0.224$$

[18] Same as [17] but bipolar

[19]



$$y_4 = -3.201; y_5 = -4.935$$

$$f(y_4) = \frac{1}{1 + e^{-3.201}} = 0.224 = 0.5$$

$$f(y_5) = \frac{1}{1 + e^{-4.935}} = 0.067 = 0.5$$

[3]

$$y_6 = 1.75 + w_{01}$$

$$y_7 = -1.75 + w_{02}$$

$$S_1 = S_2 \Rightarrow \frac{1}{1 + e^{-1.75 - w_{01}}} = \frac{1}{1 + e^{1.75 - w_{02}}} \\ e^{-1.75 - w_{01}} = e^{1.75 - w_{02}}$$

$$-1.75 - w_{01} = 1.75 - w_{02}$$

$$\Rightarrow w_{02} = w_{01} + 3.5$$

20 \rightarrow مكرر (sigmoidal) $S = 0.3$

21 get w_0 at $S = -0.3$

Cannot be solved since sigmoidal output

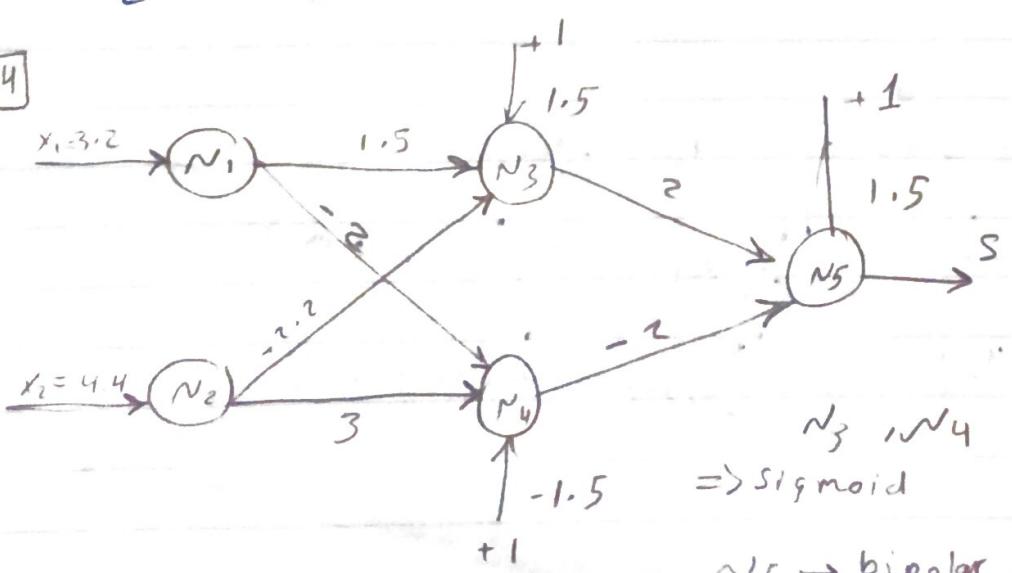
~~can't be negative~~ $0 \leq \text{output} \leq 1$

22 مكررة و معاكسة

23 $S = -1.5$ \rightarrow معاكسة

$[-1, 1]$ معادلة المعاكسة

24



N_3, N_4

\Rightarrow Sigmoid

$N_5 \rightarrow$ bipolar Sigmoid

Find S

4)

$$y_3 = (-2 \cdot 2)(4 \cdot 4) + (1 \cdot 5)(3 \cdot 2) + 1 \cdot 5 = -3.38$$

$$y_4 = (-2)(3 \cdot 2) + (3)(4 \cdot 4) + -1 \cdot 5 = 5.3$$

$$f(y_3) = \frac{1}{1 + e^{3.38}} = 0.033$$

$$f(y_4) = \frac{1}{1 + e^{-5.3}} = 0.995$$

$$y_5 = 0.033 \cdot 2 + 1 \cdot 5 + 0.995 \cdot \cancel{4}^r - 2 = 0.561$$

$$S = \frac{1 - e^{-0.561}}{1 + e^{-0.561}} = 0.273$$